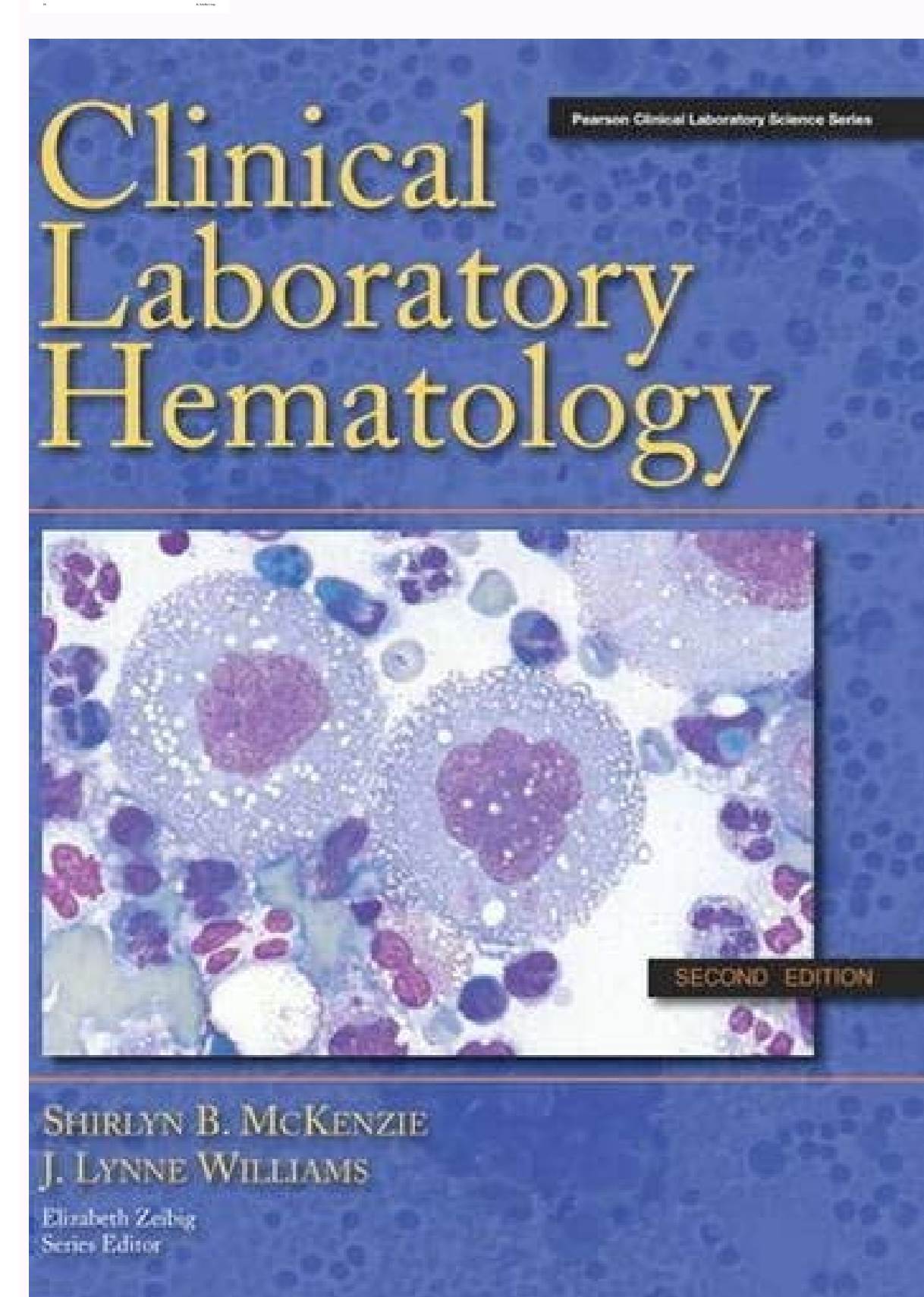
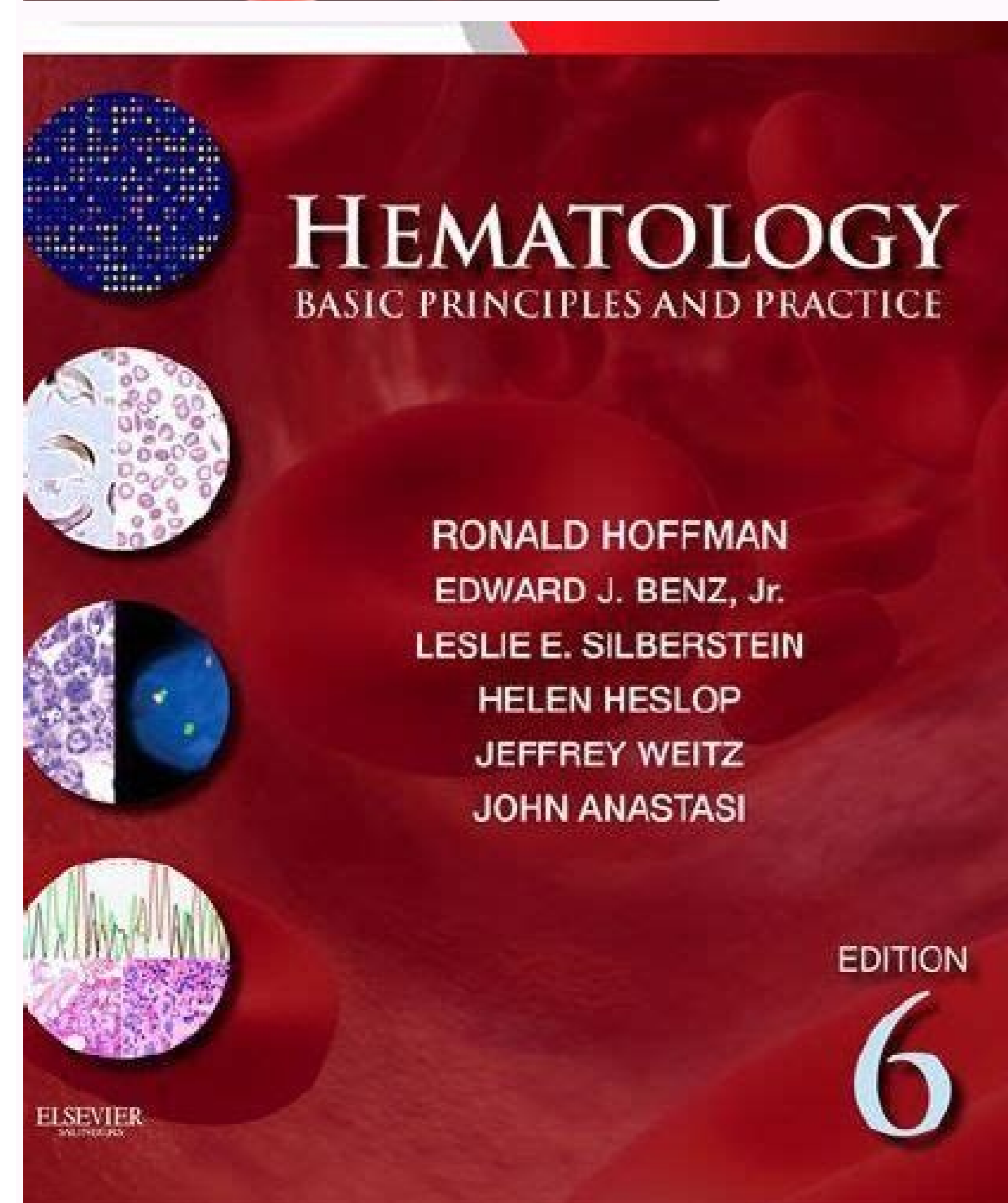
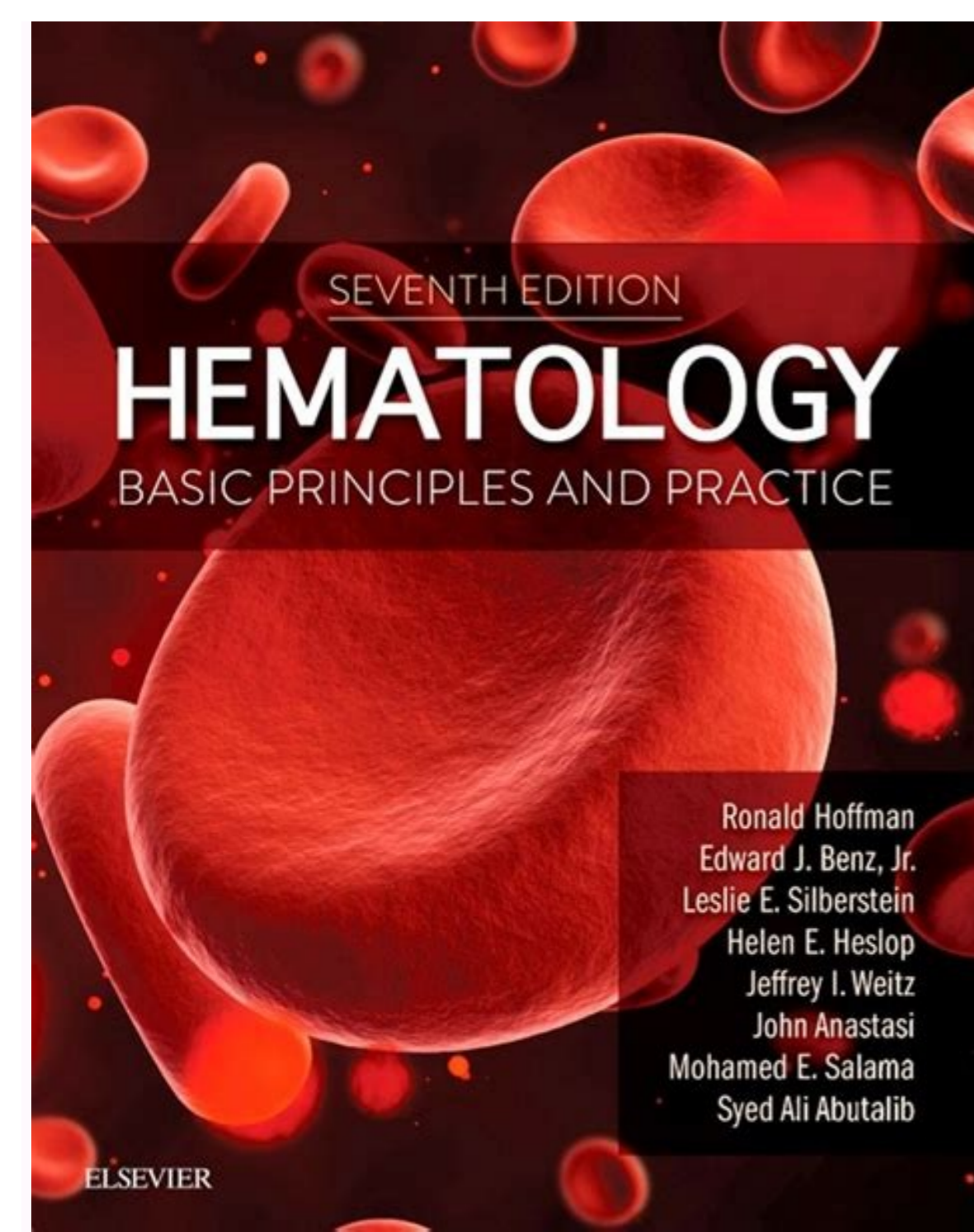


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Guideline

Laboratory Medicine Best Practice Guideline: Vitamins A, E and the Carotenoids in Blood

*Ronda F Greaves,^{1,2,3} Gerald A Woollard,^{1,4} Kirsten E Hoad,^{1,5} Trevor A Walmsley,^{1,6} Lambro A Johnson,^{1,7} Scott Briscoe,^{1,7} Sabrina Koetsier,^{1,8} Samantha Harrower,^{1,9} Janice P Gill^{1,8}

¹Australasian Association of Clinical Biochemists, Vitamins Working Party; ²School of Medical Sciences, RMIT University, Melbourne, Vic., Australia; ³Centre for Hormone Research, Murdoch Children's Research Institute, Melbourne, Vic., Australia; ⁴Department of Specialist Chemical Pathology, Auckland City Hospital, Auckland, New Zealand; ⁵Core Clinical Pathology and Biochemistry, Royal Perth Hospital, Perth, WA, Australia; ⁶Biochemistry Department, Canterbury Health Laboratories, Christchurch, New Zealand; ⁷Department of Chemical Pathology, Pathology Queensland, Brisbane, Qld, Australia; ⁸RCPAQAP Chemical Pathology, Adelaide, SA, Australia; ⁹Sullivan and Nicolaidis Pathology, Brisbane, Qld, Australia.

*For correspondence: Dr Ronda Greaves, ronda.greaves@rmit.edu.au

Abstract

Despite apparent method similarities between laboratories there appear to be confounding factors inhibiting uniform reporting and standardisation of vitamin assays. The Australasian Association of Clinical Biochemists (AACB) Vitamins Working Party, in conjunction with The Royal College of Pathologists of Australasia Quality Assurance Programs, has formulated a guideline to improve performance, reproducibility and accuracy of fat-soluble vitamin results. The aim of the guideline is to identify critical pre-analytical, analytical and post-analytical components of the analysis of vitamins A, E and carotenoids in blood to promote best practice and harmonisation. This best practice guideline has been developed with reference to the Centers for Disease Control and Prevention (CDC) "Laboratory Medicine Best Practices: Developing an Evidence-Based Review and Evaluation Process". The CDC document cites an evaluation framework for generating best practice recommendations that are specific to laboratory medicine. These 50 recommendations proposed herein, were generated from a comprehensive literature search and the extensive combined experience of the AACB Vitamins Working Party members. They were formulated based on comparison between an impact assessment rating and strength of evidence and were classified as either: (1) strongly recommend, (2) recommend, (3) no recommendation for or against, or (4) recommend against. These best practice recommendations represent the consensus views, in association with peer reviewed evidence of the AACB Vitamins Working Party, towards best practice for the collection, analysis and interpretation of vitamins A, E and carotenoids in blood.

Introduction

In the early 1980s there was a flurry of papers attesting to the suitability of high performance liquid chromatography (HPLC) for the measurement of fat-soluble vitamins and carotenoids in serum and food. With these improved assays came an enormous increase of interest in the multiple facets of their biochemical and nutritional importance and a heightened awareness of their relationship to chronic diseases and overall population health.

The four fat-soluble vitamins (A, D, E and K) themselves are chemically and biochemically distinct and seldom share common biological dynamics. They have different absorption, metabolism, distribution and clearance but are

well characterised compounds with known structures and some common properties which facilitate their measurement (Figure 1). Of these, blood vitamin A and E are usually measured together in the same assay - which may also include the carotenoids - whereas vitamins D and K have levels in blood that are too low to be conveniently measured by the same techniques.

Even though vitamin A and E are not biochemically connected, it is expedient to measure them together as their levels may both be compromised in diseases of fat malabsorption such as cystic fibrosis, inflammatory bowel disease, coeliac disease, tropical sprue, and short bowel syndrome.¹ In addition, in countries with a low Gross Domestic Product, malnutrition is

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